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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------|-------------|----------------------|---------------------|----------------------------|
| 10/646,226 | 08/22/2003 | Izaya Okae | 112857-424 | 1391 |
| 29175 | 7590 | 05/25/2006 | | EXAMINER |
| BELL, BOYD & LLOYD, LLC | | | | ECHELMAYER, ALIX ELIZABETH |
| P. O. BOX 1135 | | | | |
| CHICAGO, IL 60690-1135 | | | ART UNIT | PAPER NUMBER |
| | | | 1745 | |

DATE MAILED: 05/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|---------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/646,226 | OKAE ET AL. | |
| | Examiner | Art Unit | |
| | Alix Elizabeth Echelmeyer | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 22 August 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-5 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>1-20-04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgement of Applicants' claim to priority has been made.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al. (US Pre-Grant Publication 2003/0124423) in view of Cho et al. (US Pre-Grant Publication 2003/0082448).

Sasaki et al. teach a positive active material for a lithium ion secondary battery containing at least one of lithium manganate and LiFePO₄ having an olivine structure. LiFePO₄ is a desirable material because of his high capacity ([0012]-[0014]). Sasaki et al. further teach that the lithium manganate can also include Co, Ni, Al, and Mg ([0041]). It is also taught that the particle diameter of LiFePO₄ should be 1 µm or less in order to provide sufficient charge-discharge capacity.

Regarding claim 1, Sasaki et al. fail to teach the LiFePO₄ as a coating.

Cho et al. teach a surface treatment layer on the active material for a battery of the formula MXO_k where they layer includes Li and Fe, P is M, and k can range from 2

to 4 (abstract, [0022], [0059]). Cho et al. also teach that lithium nickelate is advantageous as the active material layer since it has a low cost and high discharge capacity ([0010]). Cho et al. teach that a surface treatment leads to better thermal stability characteristics ([0145]).

It would be desirable to create a LiFePO₄ coating on a lithium nickelate substrate for the active material of a battery in order to create better thermal stability characteristics.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to coat lithium nickelate with LiFePO₄ to create a positive active material electrode in order to produce better thermal stability characteristics.

As for claim 3, Sasaki et al. teach a desirable size for the LiFePO₄ particles but fail to teach a desirable size for the substrate particles. Cho et al. teach that the average particle size of the lithiated intercalation particles is 1 to 20 µm, preferably 3 to 15 µm ([0071]).

Regarding claim 4, Cho et al. teach that the desired thickness of the coating is 0.01 to 2 µm, and that above 2 µm, the capacity of the film deteriorates ([0058]).

With regard to claim 5, the secondary battery of either Sasaki et al. or Cho et al. would include a negative electrode containing metal. Li, Li alloy, or a material allowing Li to be doped or undoped, a nonaqueous electrolyte, and the nickelate/olivine structure discussed above, since the negative electrode and electrolyte would be necessary in order to create a current from the battery.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al. in view of Cho et al. as applied to claims 1, 3, and 4 above, and further in view of Negoro et al. (US Patent Number 6,156,459).

The teachings of Sasaki et al. and Cho et al. as discussed above are incorporated herein.

Sasaki et al. and Cho et al. teach that the coating of LiFeO₄ should be thin to prevent deterioration of capacity but are silent on the weight percent of LiFeO₄ to lithium nickelate substrate.

Negoro et al. teach that the conducting agent of the positive-active material of a secondary battery should be between 6 and 50 weight percent (3:49-54).

It is desirable to keep the amount of coating low in order to prevent deterioration of capacity.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the weight percent guideline given by Negoro et al. in the coating of Sasaki et al. in view of Cho et al. in order to prevent deterioration of capacity of the positive active electrode material.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

aee